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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,755	09/06/2003	Chen-Kuei Chung	64,600-120	9071
7590 02/09/2005				
SHAW PITTMAN LLP 1650 Tysons Boulevard McLean, VA 22102			EXAMINER STEPHENS, JUANITA DIONNE	
			ART UNIT 2853	PAPER NUMBER

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/656,755

Applicant(s)

CHUNG ET AL.

Examiner

Juanita D. Stephens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Election filed 1/13/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 10-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 10-14 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 1/13/05.

2. Applicant's election with traverse of Group I, claims 1-9 in the reply filed on 1/13/05 is acknowledged. The traversal is on the ground(s) that the applicant believe that the subject matter of all claims, is sufficiently related that a thorough and complete search for the subject matter of the non-elected claims. This is not found persuasive because restriction is proper when claims are directed to independent and distinct inventions. The Examiners position is that, it would be a burden to examine claims which have acquired a separate status in the art as shown by their different classifications and because of their recognized divergent subject matter, thus, these claims are best examined in the area for which the method claims are directed

The requirement is still deemed proper and is therefore made FINAL.

**Applicant should in next response cancel the non-elected claims 10-14.**

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Reference number "30". Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in

the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference number "86" not shown on Fig. 3A as indicated on page 12, line 13 of the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

***Claim Objections***

6. Claims 3 and 9 objected to because of the following informalities:

Claim 3 recite "wherein said first plurality is three", however, it is not clear as to which first plurality" applicant is referring to (i.e. heaters, electrodes or chambers). Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kruger et al. (US 4,480,259).

Kruger et al. discloses a thermal bubble membrane actuator (Fig. 3) for ejecting a liquid comprising: 1) a base substrate (67) of a semi-conducting material (col 4, ln 4), 2) a first plurality of heating elements (resistors 23, 43, 63) formed on said base substrate (col 4, ln 27), 3) a first plurality of electrodes (conductors 26, 45) each in electrical communication with one of said first plurality of heating elements (col 2, lns 45-46; col 3, lns 55-56), 4) a first plurality of chambers (formed by barrier 65) formed in a first thick film photoresist layer (barrier 65) with one of said first plurality of chambers formed on

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top of each of said first plurality of heating elements (col 4lns 16-20), 5) a membrane (flexible membrane 55) on top of said first thick film photoresist layer sealing a tope of each of said plurality of chambers (col 4, lns 10-11), 6) a liquid flow channel formed in a second thick film photoresist layer (spacer 57) on tope of said membrane (col 4, lns 8-11), 7) a top substrate (top 51) sealing a top of said liquid flow chamber (col 4, ln10), 7) a liquid inlet (ink feed hole) and liquid outlet (orifices 53) formed in said top substrate each in fluid communication with said liquid flow channel, 8) wherein said first plurality is three (as shown in Figs. 4A and 4B), 9) wherein said first plurality of chambers is three chambers with one chamber positioned juxtaposed to said liquid inlet and another chamber positioned juxtaposed to said liquid outlet (as shown in Figs. 4A and 4B), 10) wherein said membrane is formed of a material having an elasticity of at least that of silicon rubber (col 3, lns 24-28), 11) wherein said membrane sealing a top of said plurality of chambers forming a plurality of hermitically sealed chambers (as shown in Figs. 2 and 3), and 12) wherein said membrane is formed of a material selected from the group consisting of rubber, PDMS, and polyparylene (col 3, lns 24-28, 13) wherein said first plurality of heating elements is formed of a material selected from the group consisting of TaAl, AfBz, AuCr and polysilicon (col 3, lns 9-12).

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger et al. (US 4,480,259) in view of Ahn (US 6,257,706 B1).

Kruger et al. discloses a thermal bubble membrane actuator (Fig. 3) for ejecting a liquid comprising: 1) a base substrate (67) of a semi-conducting material (col 4, ln 4), 2) a first plurality of heating elements (resistors 23, 43, 63) formed on said base substrate (col 4, ln 27), 3) a first plurality of electrodes (conductors 26, 45) each in electrical communication with one of said first plurality of heating elements (col 2, lns 45-46; col 3, lns 55-56), 4) a first plurality of chambers (formed by barrier 65) formed in a first thick film photoresist layer (barrier 65) with one of said first plurality of chambers formed on top of each of said first plurality of heating elements (col 4 lns 16-20), 5) a membrane (flexible membrane 55) on top of said first thick film photoresist layer sealing a tope of each of said plurality of chambers (col 4, lns 10-11), 6) a liquid flow channel formed in a second thick film photoresist layer (spacer 57) on tope of said membrane (col 4, lns 8-11), 7) a top substrate (top 51) sealing a top of said liquid flow chamber (col 4, ln10), 7) a liquid inlet (ink feed hole) and liquid outlet (orifices 53) formed in said top substrate each in fluid communication with said liquid flow channel, 8) wherein said first plurality is three (as shown in Figs. 4A and 4B), 9) wherein said first plurality of chambers is three chambers with one chamber positioned juxtaposed to said liquid inlet and another chamber positioned juxtaposed to said liquid outlet (as shown in Figs. 4A and 4B), 10) wherein said membrane is formed of a material having an elasticity of at least that of silicon rubber (col 3, lns 24-28), 11) wherein said membrane sealing a top of said plurality of chambers forming a plurality of hermitically sealed chambers (as shown in

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Figs. 2 and 3), and 12) wherein said membrane is formed of a material selected from the group consisting of rubber, PDMS, and polyparylene (col 3, Ins 24-28, 13) wherein said first plurality of heating elements is formed of a material selected from the group consisting of TaAl, AfBz, AuCr and polysilicon (col 3, Ins 9-12). Kruger et al. further at least teaches that materials for construction of the ink jet head can vary widely.

Kruger et al. does not teach that the substrate is made of silicon (as recited in claim 2). Ahn at least teaches a substrate 1 made of silicon (col 8, In 55). It would have been obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Kruger et al. by providing the silicon as the material of the substrate as taught to be old by Ahn for the purpose of providing a substrate with high mechanical strength, rigidity and thermal conductivity.

#### ***Allowable Subject Matter***

11. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach, suggest or render obvious the limitation of wherein a middle chamber in said three chambers cooperating with a middle heating element functions as an anti-back flow valve. This invention solves the problem of accurately controlling the fluid flow rate.

#### **Contact Information**



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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juanita D. Stephens whose telephone number is (571) 272-2153. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



February 7, 2005

Juanita D. Stephens  
Primary Examiner  
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